



EXTRACORPOREAL STORAGE OF ORGANS

The invention relates to an arrangement for extracorporeal storage of organs which in a manner that is prior art artificially maintains or regenerates the 5 vital functions of organs. As used herein, the term organ also includes limbs and tissue lobes and the like; hence, organ is used as a generic term.

An important field of use is, in particular, the transport of organs or, furthermore, biochemical or pharmacological examinations in isolated organs.

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Devices for the perfusion of isolated organs are prior art.

Schön, M. R. uses such a perfusion device with such a fluid-filled, closed organ perfusion chamber with cyclic pressure fluctuations for normothermic 15 extracorporeal liver perfusion (Transplantation von Lebern nicht-herzschlagender Spender im Schweineleber-Transplantationsmodell - Habilitationsschrift 1999. Humboldt Universität zu Berlin). Water heated to about 37°C in an external heat exchanger flows through the organ perfusion chamber. This circuit is needed in addition to the perfusion circuit and the 20 dialysate circuit.

It is the aim of the invention to provide a design of a device as simple as possible for the extracorporeal storage of organs. In transplantation surgery, particularly, the transport and maintenance of the functional ability of the 25 organs is an important task of organ and transplantation logistics with partly global operation.

According to the invention, this object is attained by the distinguishing features of the main claim. Other useful embodiments of the invention result from the following claims.

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The arrangement for the extracorporeal storage of organs according to the invention consists at least of an organ perfusion chamber with a controllable temperature device.

Disposed in the organ perfusion chamber is an organ which is covered by a protective cover. The protective cover is preferably executed as an impermeable plastic bag. The organ protected in this manner is maintained in a completely floating state in the storage fluid.

The invention is based on the conception to use the dialysate which is already available as storage fluid. The dialysate is an important component for maintaining the vital functions of the organ and as such is also an important component of the vital-state maintaining circuit, which is composed of a dialysate circuit and a perfusate circuit for supplying the extracorporeal organ. According to the invention, the required dialysate circuit and the apparatuses needed for it are used to integrate the storage fluid as dialysate in the dialysate circuit and at the same time to use the organ perfusion chamber as reservoir for the dialysate.

The organ perfusion chamber is hermetically closed tight to liquid and pressure. In addition to the medical necessity, this makes transport by plane or helicopter possible, in particular.

The wall of the organ perfusion chamber, the protective cover and the dialysate are transparent.

A controllable temperature device provides the normothermic or hypothermic
5 ambient temperature for the extracorporeal organ. The temperature device is
preferably executed as heating mat lining the bottom of the organ perfusion
chamber. The flow of the dialysate ensures that a uniform temperature of
the isolated organ is maintained. In another preferred embodiment of the
invention, the temperature device is integrated in the wall of the organ
10 perfusion chamber as heating and cooling loops.

Several measuring probes pick up characteristics and parameters of the circuit,
for example, filling level, pressure, temperature and enable the processing of
these signals for an indicating device or a digital process control.

15 With reference to the accompanying drawing, one example of the embodiment of
the invention will now be described in detail.

Figure 1 schematically depicts an arrangement for the extracorporeal storage
of organs. The arrangement comprises a transparent organ perfusion
20 chamber 1. The organ perfusion chamber is closed hermetically with quick-
release fasteners and is tight to fluid and pressure. In this embodiment, a
liver, as organ 2, is stored at normothermic temperature. The protective
cover 21 is a impermeable, transparent plastic bag.

The covered organ 2 is maintained in a completely floating state in a storage
25 fluid 4. The storage fluid 4 is a dialysate and is a component of the vital-
state maintaining circuit 5. A controllable temperature device 3 is integrated

as heating mat in the organ perfusion chamber 1. Several measuring probes 6 supply signals for a process control, and a level indicator 61 indicates the level of the storage fluid 4. Disposed vertically on the organ perfusion chamber 1 is, by way of example, a riser as means of level indication 61. In Fig. 1, this riser has been turned through 90° in the plane of the sheet.